

MUSCLES

MIND and

MORALS.

BY

EDW^d T. TIBBITS, M.D. LOND:

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9th March



MUSCLES, MIND, AND MORALS:

OR,

HINTS ON THE PROLONGATION OF LIFE.

BY

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OMISSION.—On page 8, line 6 from the bottom, after pure water read “and wholesome food.”



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INTRODUCTION.

ALTHOUGH the ideas contained in the following pages were originally written out and arranged merely as a basis for discussion at a scientific meeting at Leeds, I have been induced, partly at the instigation of some of my professional friends, to amplify, and publish them in the present form. Two or three years ago they appeared, somewhat abbreviated, in the pages of *The Lancet*, bearing the title, "Systematic Exercises; their value in the prevention of disease." Since that time fresh material has been introduced, and I have moreover endeavoured to make my views on the subject as intelligible as possible to any one who may care to read them. On the present occasion, for the sake of brevity, as well as because it seems to indicate the order and character of my arguments, I have selected as a suitable title—"Muscles, Mind, and Morals, or Hints on the Prolongation of Life."

The importance of systematic exercises cannot, I think, be over-estimated, especially in these

so-called enlightened days, when education is at the highest possible pressure. By systematic exercises I mean exercises both physical and mental, *i.e.*, of the muscles and of the mind, more particularly the former, to which I am anxious to direct special attention. Of course I am fully conscious of the value of mental exercise, the suitable regulation of which in different individuals, and at different times, requires the most careful consideration and judgment. In the course of the following remarks I hope to be able to show what a powerful and beneficial influence judicious exercise of body and mind exerts upon the morals.

During the past few years Sanitary Science has been making giant strides, in some instances, however, on very doubtful and insecure foundations. There is, therefore, much yet that remains to be done in this direction. I presume that almost every one is convinced of the necessity, from a sanitary point of view, of a plentiful supply of fresh air and pure water, of well-regulated diet, and efficient clothing, of warmth and sunshine, and last, but by no means least, of a scrupulous attention to cleanliness in every detail of life. All these conditions, admirable

and desirable as they are, may be present, and yet in some cases there is gradual failure of health. What is the cause? It is not improbable that sometimes injudicious, unsuitable, or insufficient exercise of body or mind is at the root of the evil. That this is frequently the case amongst the upper and middle classes in this country there can be no reasonable doubt. And it is more likely to happen when there is distinct hereditary predisposition to some constitutional disease. At the present time, during the period of growth and development, the various avenues leading to the youthful brain are in many instances literally crammed to suffocation. The brain is expected to absorb the greatest possible amount of crude knowledge in the least possible time. Examiners now-a-days appear to require not only correct answers to questions (which is reasonable enough), but they must be given in a comparatively short space of time. The time allowed is too short, except for the few who are endowed with talents of a more than ordinary kind. Too much is attempted in one direction. The strain in one part of the nervous system is too great and long continued. There is not sufficient distribution of nerve force, hence a

liability to break down. And such a break down, more or less complete, is by no means uncommon, especially amongst girls, just as they are beginning to breathe the atmosphere and experience the responsibilities and trials of womanhood.

Such training, with an occasional accident of this description, must inevitably end in the physical and mental degeneration of the human species.

Wherefore, I think it may perchance contribute in some instances to improve the condition of the masses by directing special attention to such a common-place, although valuable, aid to the preservation of health as exercise. This has not as a rule been particularly noticed by our health officers. Their duties, as at present marked out for them, consist mainly in providing thoroughly efficient ventilation and drainage in and about our dwelling-houses, together with a plentiful supply of pure water; and in endeavouring to check the spread of serious epidemics of infectious fevers, by isolation and other auxiliary methods. All such work cannot be too highly appreciated, and the public owe an ever-increasing debt of gratitude to those members of the

medical profession who forced upon the Legislature of this country the appointment of health officers.

Much is due to these guardians of the public health, but there is still a wide and as yet imperfectly explored field before them.

“Sewer gas and germs” seems to be *the* great war-cry of many of those whose province it is to grapple with disease and its various causes. This is all very well, and a well-balanced estimate of its power and significance is highly desirable. At the same time it will not tend to the diminution of disease or the promotion of science, if the specious hypotheses of enthusiasts are hastily accepted without corroboration by several independent observers. Disease germs and the theories connected therewith are as yet—and I write this advisedly—*as yet* enveloped in an almost impenetrable haze of doubt and mystery. It must not be forgotten that there are other potent, unmistakable, and very common causes of disease besides germs and sewer gas. And although the germ theory of disease may eventually prove to be partially, if not wholly true, there is no question that its importance during the last year or two has been wofully exaggerated, and in many instances entirely mis-

applied, notwithstanding the palpable and direct evidence of other causation to the unprejudiced observer. These germs taking a prominent, or rather a fashionable, position in the scientific world, have been erroneously recorded, and that too in an official manner, as the positive morbid agents on various occasions. The statements here made I am prepared to substantiate, if need be, in every particular, in such a manner as to leave no possible room for doubt even in the most sceptical mind. I can readily imagine some of my readers wondering whether my mode of life is in any way regulated by the ideas I have attempted to describe and explain in the following pages. To a certain extent I can affirm that it is, although I am afraid I must confess in a very incomplete and unsatisfactory manner. This does not, however, diminish the probability of such ideas being correct, or detract from their value when thoroughly carried out. Had I thought it necessary or advisable I could have illustrated many of my statements by relating some personal experiences.

Putting aside what is usually possible to ordinary mortals, it is highly probable that as a rule the general good health and prospects of

long life in any individual having no constitutional delicacy, are greatly promoted by habitual self-denial of a more or less decided character. Of course I do not refer to that species of self-denial, of a morbid and frequently ostentatious nature, which is injurious both to mind and body.

MUSCLES.

IN introducing this subject I do not for a moment imagine I shall disclose any great novelty, but it is quite possible the importance with which I have regarded it may be considered by some persons exaggerated, unproven, or altogether fanciful.

It will be universally admitted that properly regulated exercise is absolutely essential for the preservation of that valuable combination, "a sound mind in a sound body." Should the exercise become deficient (which is by far the more frequent error), excessive, or irregular, unsoundness of mind or body, to a greater or less extent, is a natural, common, although perhaps not invariable consequence.

When advocating the importance of physical exercises I have been told, on more than one occasion, that, amongst other evils, they have a tendency to induce affections of the heart and lungs, as well as spinal and other deformities, more especially in debilitated constitutions. This admits of no contradiction. Of course they

have. Excessive or injudicious exercises, be they physical or mental, not only have a tendency to produce evil results, but it would be a thing beyond reason if under the circumstances the results were anything else but injurious. In order that exercises may be conducive to health, they should not only be properly regulated, but a due allowance must be made for the constitution, occupation, social position, and habits of life of each individual.

Now, it must be borne in mind that the function of the medical profession is mainly of a twofold nature, viz., (1) to prevent disease, and (2) to cure it. In numerous instances, notwithstanding the utmost precautions and most careful treatment, all efforts in the way of cure are unavailing. Disease marches along with but little check, and the register of deaths month after month, and year after year, testifies that much of that disease is beyond the power of the healing art.

If, however, medical men are enabled, it may be in a somewhat limited manner, to prevent some diseases, and from time to time cure others or assist nature in so doing, in either case their labours have a tendency to prolong the term of human life.

And, although I believe systematic exercises are extremely useful in the treatment of many diseases, especially those affecting the various parts of the nervous system, my object on the present occasion is to delineate, as accurately as I am able, a sketch of what appears to me their value in the prevention of disease. I think I shall not be taking too much liberty here if I venture to consider the expressions "prevention of disease" and "prolongation of life" equivalent. This is not, of course, logically correct, but the illustrations to be noticed hereafter will, I trust, sufficiently justify me in using the one as a synonym of the other.

The sanitary influence, then, of physical exercise may be considered to spring from two sources, the direct or primary, and the indirect or secondary, from which flow (each in its own especial manner) certain beneficial effects on the various complicated structures and organs with which the human body abounds.

Firstly, then, a few words concerning the primary physical, or chemico-physical source. The direct beneficial effects of a proper amount of exercise are acknowledged by all men—lay as well as professional; nevertheless it is a fact,

especially as regards its systematic character, which is practically ignored by a very large number of individuals. It is, I am convinced, no exaggeration to state that a walk of two to four or even more miles daily is all-powerful to ward off many an attack, it may be of serious illness, which, even in case of recovery, would require weeks of care and judicious treatment to remove by the aid of drugs, diet, and rest. Of course the distance and pace must be properly regulated in each individual case. It may be said that riding in carriage, omnibus, train, &c., is so much quicker, more convenient, and more comfortable. This argument is a very plausible one, and sufficiently satisfactory to the masses. But it does not follow as a matter of course that such a pleasant combination in travelling short distances is calculated to promote a healthy condition of body; in fact, in the absence of other exercise, the tendency is exactly the reverse. Speed, convenience, comfort, and luxury, not only as regards travelling, but in the ordinary business of life, have greatly increased with the rise and progress of civilisation. And although it appears desirable to encourage the growth and development of a civilising

influence throughout the world, unfortunately, it is certain that with it are almost invariably associated habits, customs, and manners which have a tendency to propagate or increase disease, and thus shorten life. Walking exercise is probably only indifferently appreciated, because of its simplicity, and the ease with which every one may partake of its benefits. But there are other powerful reasons why it should be disregarded. Hundreds of individuals who discard anything like active exercise, live apparently in perfect health, and keep on living until the allotted term of three score years and ten has been attained; hence the existence of a certain amount of scepticism on this point cannot be a matter of surprise. This, however, does not, I think, invalidate any arguments in favour of exercise.

Without entering very minutely into details, I will simply enumerate some of the important general effects of physical exercise on the human body.

(1) It increases the action of the skin, lungs, &c., &c.; that is to say, all those organs specially designed for the separation and removal of waste products. These, if retained in the

blood in undue quantity, or for too long a period, give rise not only to discomfort and temporary disorder, but also in certain cases to serious, if not incurable disease. Some of the effete substances above-mentioned consist of nutritive material, more or less changed, which has been taken over and above what was actually necessary for the maintenance and repair of the various tissues of the body.

(2) It increases the quantity of heat within the body, although it probably does not produce much, if any, elevation of temperature. As regards quantity, that must be sufficiently familiar to every one. For who does not know by experience that warmth produced by exercise is far more general, efficient, and enduring than that obtained in an artificial manner. Chilblains, as far as I have noticed, more commonly attack those individuals who do not, or who are unable to take sufficient walking, or other physical exercise.

(3) By its action on the skin it produces evaporation of some of the water which constitutes so large a portion of the fluids of the body. The consistence of the residue is thereby increased, and in consequence absorption of food

(especially the watery part of it) takes place more rapidly, and with greater facility. Moreover, it is not unreasonable to suppose that the assimilation of food is more thorough and complete. There is, so to speak, a more accurate adaptation of the materials employed in the process of repair, which should always be going on with regularity.

(4) The determination of the blood to the muscles during physical exercise to a certain extent drains the internal organs, and, as a consequence, they perform their respective functions more efficiently when called upon to do so. There is, as it were, a flushing of all the vessels containing blood and lymph, and of the tissues generally. Any tendency to stagnation or obstruction would in this manner probably be overcome. Under the influence of judicious exercise there is no doubt that the tissue change throughout the body is carried on with greater vigour and completeness. Nutrition is more active. There is more destruction of tissue in a given time, and therefore more repair, and in this way the ultimate elements of the body are replaced more frequently.

In a few words, to recapitulate, the effects of

properly regulated systematic exercises are the production of a more intimate and rapid tissue change, and at the same time increased and more efficient functional activity of all parts of the body.

The steady, regular, and moderate action of all parts of the body is that best calculated to maintain the health and prolong the life of every member of the human race.

But on the other hand, it is advisable here to refer very briefly to some of the principal results of want of exercise. If the foregoing remarks concerning the effects of a moderate amount of exercise on the human body be correct, it follows almost as a matter of course that deficient exercise must be followed by certain physical changes more or less prejudicial to health. Amongst such changes may be mentioned:—

(1) A tendency to congestion of the internal organs and a general sluggishness, or even stagnation of the blood in the small vessels. It is not improbable that a little obstruction here and there caused in this manner may be the starting point of some serious disease of the organ in which it happens to exist.

(2) Undue retention of effete or superfluous

nutritive substances either in too great quantity or for too long a period. Apart from the possibility of the origin of disease under such conditions, it must not be forgotten that when the tissues are thus overcharged with what may be regarded as so much slow poison, acute disease or serious accident is much more likely to prove fatal.

In one instance the result of deficient exercise is exhibited by a vast accumulation of fat in all parts of the body; in another, disease of the liver, kidneys, or lungs is induced; and perhaps in a third, the already certain tendency to gout or rheumatism develops into positive disease. Again, the various forms of nervous diseases, so common and intractable amongst the upper classes, might be very greatly diminished, if not altogether prevented, by suitable occupation of mind and body, that is to say, by regular mental and physical exercise.

There is no doubt Dr. Wilks is positively right when he says that many more people suffer from "underwork" than "overwork." The following are his exact words:—"In my experience I see more ailments arise from want of occupation than from overwork, and taking

the various kinds of nervous and dyspeptic ailments which we are constantly treating, I find at least *six* due to idleness to *one* from overwork." These are the words of an eminent physician of large experience, and such is the conclusion at which he has arrived.

And here I think it will not be out of place to refer briefly to the principal conclusions at which Dr. Pavy arrived in his interesting investigations on Weston, the pedestrian. He says—

(1) That although there is greater elimination of nitrogen during severe exercise than can be accounted for by increased nitrogenous food, the motor power does not arise from oxidation of muscular tissue; and the greater proportion of nitrogen eliminated is probably directly derived from metamorphosis of nitrogenised food, without passing through the muscular tissue at all.

(2) That supposing the elimination of one grain of nitrogen to represent about 2·5 foot tons, that is to say, a force necessary to raise $2\frac{1}{2}$ tons one foot, it was calculated that the nitrogen eliminated was only sufficient to account for half the force expended. It is natural, therefore, to conclude that a considerable quantity of

force must be developed from the consumption of hydro-carbonaceous food, *i.e.*, all descriptions of fat.

I may mention that Weston's work during his six days' walk represented nearly 1200 foot tons daily. According to the late Dr. Parkes, 500 foot tons is an extremely hard days' work. "Every man," says the same writer, "ought to take an amount of daily exercise of some description equivalent to about 150 foot tons, or a nine miles walk." Although there are comparatively few individuals who make a point of actually walking nine miles daily, there are many who do an amount of work almost unconsciously in some form or other very nearly equivalent to that walk.

(3) That increased exertion requires an increased quantity of nitrogenous food.

(4) That with the exception of chlorine, sodium, and magnesium, there is a great increase in all the mineral ingredients in the excreta, the most notable being that of phosphoric acid, which is nearly doubled during severe muscular exercise.

MIND—ITS VARIETIES AND PHYSICAL BASIS.

AMONGST the familiar expressions employed in general conversation, and in the ordinary transactions of every day life, there are none which occur much more frequently than “I will ” and “I will not ” act in such a manner. What do they imply? Simply that the individual speaking has the power of regulating his actions by what is called “choice ” or “selection.” He either wills to do, or wills not to do. And that man is said to have the strongest will who accomplishes his purpose, in spite of numerous, and to casual observers almost insuperable difficulties. The strength of that will is the result of several factors. To a certain extent it is doubtless natural, since it is a mental characteristic which is sometimes exhibited at a very early period of life. Notwithstanding the numerous methods employed to divert the infant mind, it is really amusing, as well as instructive, to watch the perseverance with which some children, barely out of their mother’s arms,

strive to execute certain unlawful movements, or reach some tempting but forbidden object.

But, in addition to this innate strength of will, there may be, and frequently are, amongst others, the important elements of moral and religious training. And further, according to my hypothesis, systematic exercises, if properly regulated, not otherwise, form no inconsiderable item in the gradual formation and consolidation of a powerful will.

Before proceeding further, it will be necessary to make a few preliminary remarks on the constitution of the mind. And here I ought to mention that most of my knowledge on this subject has been derived from Professor Bain's interesting works. The human mind is supposed to have, if I may so call it, a trivet nucleus, feeling, thought, and volition or will—not three distinct nuclei, but one nucleus divided into three portions united together. The majority of writers on mental science, although differing greatly in words and phrases, appear to give a kind of general assent to this three-fold division.

(1) *Feeling* embraces the various pleasures and pains experienced through the media of the special senses ; the sensations of organic life,

i.e., those connected with certain organs and functions, including the so-called muscular sense, and all kinds of emotion.

(2) *Thought* embodies three fundamental attributes—

(a) Consciousness of agreement.

(b) Consciousness of difference.

(c) Retentiveness or memory.

(3) *Volition* or will is action following on feeling, or the putting forth of energy through the medium of muscles to serve an end. This applies quite as appropriately to self-restraint. For there is frequently an immense expenditure of nervous force or energy required for the control or suppression of certain movements and phenomena which are promoted by powerful feelings.

For the sake of argument, at any rate, it may be granted that these three portions are equal in a perfectly well-developed and well-balanced mind. The different phases of human character met with in our journey through life depend in a great measure upon the proportion in which these three elements of the mental nucleus are combined. One individual is over-sensitive, another is so much absorbed in thought that ordinary

matters are overlooked or disregarded, while a third carries out the dictates of his will, almost irrespective of his own feelings or those of others. Professor Bain, in his "Study of Character," gives the following admirable illustrations. "Bacon," he says, "had a prodigious intellect, but he was wanting in self-control, and extremely deficient in feeling. In the character of Charles James Fox, there was a superabundance of emotion, with plenty of intellect but deficient will, consequently he was reckless and unbusinesslike, and not fit for the drudgery of office. His rival Pitt was wanting in emotion, but had a large share of both will and intellect."

It is not common to meet with intense feeling, vigorous intellect, and a powerful will in the same individual; still I presume that no one, apart from politics or party feeling, would venture to deny the existence of such a combination in the mental constitution of that great patriot and talented British statesman who has recently passed away—of course I refer to the Earl of Beaconsfield. In our present illustrious Premier we have, as I imagine, an example of a somewhat similar combination, although differing greatly in quality. Possessed of a marvellous

intellect, and undoubtedly of considerable physical strength, he is well known to take great delight in violent muscular exercise. Those who feel inclined to smile at the Prime Minister of England with an axe in his hand, would do well, as far as the principle of muscular exercise is concerned, to follow his good example, thereby in all probability maintaining, and perhaps increasing, vigour both of body and mind.

Who shall say that this predilection of Mr. Gladstone's has not, in a greater or less degree, contributed to make him what he is at the age of seventy-two years,—a giant in physical and mental strength? At the same time it will be very generally admitted that the felling of huge trees is far too violent and dangerous an exercise in advanced life, when the power of repair is on the wane, and all the tissues of the body are failing in strength and elasticity.

From these few illustrations I return to consider the constitution of the mind. It is generally supposed that the brain is the organ of the mind. The mental operations, however, carried on within the skull could not take place independently of the senses. And the senses can have no existence apart from the organs by

means of which we taste, smell, feel, hear, and see. Each sense is represented by a special apparatus for the reception of impressions coming from the outer world, which are conveyed to the brain through the medium of very fine threads or fibres, and are there perceived and duly interpreted. Certain conditions, however, are necessary for the proper appreciation of objects or phenomena coming under the cognisance of the special senses. Every part concerned in the completion of the sensation must be sound and active. Really good vision requires perfection of the complicated optical apparatus of the eye, continuity of healthy nerve fibres or threads connecting the eye with the brain; and lastly, the brain itself in good working order. And analogous conditions are necessary in all other sensations. One part is adapted for receiving impressions, another for conducting them, and a third for recognising or interpreting them, and unless each part is intact the sense is impaired or absolutely destroyed.

It must not then be forgotten that all our knowledge has come to us, and must come to us, through the agency of one or all of these senses. We are delighted or disgusted with the various

sensations experienced. We recall them and think over them. Then, through the medium of certain nerve fibres, motor as they are called, passing from the brain to the muscles (an important item in the action of the will be it noted), we execute certain movements in order to prevent or encourage a recurrence of the sensations in question. Without these senses, however perfect the body in other respects, there could not possibly be any mental power or growth.

Hence, mind appears to involve not only the centres but the peripheral portion of the nervous system. Seeing how closely muscular action is connected with the feelings and the will, and how powerfully the majority of the glands and viscera are affected by certain kinds and degrees of emotion, mind might even be said to exist in the muscles, and to a certain extent in every organ of the body; that in fact it includes body; that the latter is a part of mind.

In all probability there are in each one of us certain innate physical and therefore mental peculiarities, which may be truthfully expressed by the word "tendency." It is well known how these tendencies may be kept in check, altered in

their course, or almost extinguished, by judicious moral and religious education, and various external influences, social and otherwise.

Such tendencies are for the most part, I believe, dependent upon the various physical conditions of the nerve cells and fibres which represent feeling, thought, and volition; and they are probably materially modified by the state of muscles, glands, and viscera. Therefore, it does not appear unphilosophical to make a division of the cells, fibres, and all tissues concerned into three groups, corresponding to the three-fold constitution of the mind as follows :—

(1) Affective. (2) Ideational. (3) Volitional. The words I borrow from Dr. Maudsley's classical work "On the Physiology and Pathology of the Mind."

Every vital process going on within the body must have its physical exponent. The circulation is carried on by means of the heart and blood vessels, respiration through the medium of the lungs, digestion and nutrition by the aid of glands and absorbent vessels in the stomach and intestines, and the special senses could not exist independently of certain intricate

apparatus peculiar to each. Every function in the human body is discharged by means of tissue or material in some form or other. In many instances it can be proved, and in those remaining it is a fairly legitimate inference.

Now, in order to demonstrate the truth of what is to follow, it will be necessary to adduce presumptive, although not absolutely conclusive, evidence that feeling, thought, and volition are represented in the human body by material in some form or other, and subject to the same laws which are known to affect almost all other vital structures.

From the evidence which I am about to bring forward, I believe it is in the highest degree probable that the three mental elements each require a normal physical condition of certain nerve cells and fibres, probably also of muscles, and perhaps other portions of the body, for their complete development and due interpretation. There seems to be absolute proof that, at any rate, different threads or fibres are concerned in sensation and motion (or we might say in feeling and will), as observed in the sensory and motor nerves in the various parts of the body. There are, in disease, numerous examples

of absolute loss of power to move without any loss of sensibility, and sometimes there is loss of feeling whilst the power of moving is retained. And it is well known that if certain nerves are divided, loss of feeling or movement is produced, according to the character of the divided nerve. It seems, then, tolerably clear that the so-called sensory and motor fibres, which contribute to the formation of the nervous cords throughout the body, as well as the centres themselves, constitute a very important portion of the two mental elements—feeling and volition. This being so, it is only natural to infer that there is some special structure, or group of structures, in existence, through the medium of which thought is worked out and fixed. Some two or three years ago I had the pleasure of listening to a very interesting paper delivered by Dr. Herbert Major, the able director of the West Riding Asylum at Wakefield, on certain points regarding the structure of the brain.

In that paper, if my memory serves me aright, the author stated that the number of branches of the large nerve cells in the brain, and the number of their communications with one another, were, to a great extent, indications of the amount of

intellectual power in any particular case. He showed, moreover, that the branches of the nerve cells and their communications were very much fewer in the child and in the brains of some of his patients who had died insane. The same proportion of branching of nerve cells and communication prevails also, as I believe he stated, in the lower animals, according to the amount of intelligence each one possesses. According to this evidence, it is, I think, justifiable to assume that the large-branched or stellate nerve cells in the brain are at any rate a portion, if not a most important portion, of the physical basis of thought. All the information, then, we possess goes to prove that we could no more think without these stellate cells, than we could breathe without lungs, see without eyes, or walk without legs. There are, then, in all probability, certain definite collections of fibres, groups of cells, &c., which are concerned in every mental operation, whether of feeling, thought, or will—in fact, each operation has a more or less well-defined physical basis, although it is not possible to draw a distinct line of demarcation between them. As in the solar spectrum there is no difficulty in recognising the three primary colours wholly

distinct from each other, whilst at the same time it is impossible to detect the precise point at which one colour begins and another ends, so it is in the constitution of the mind.

There is no doubt about the prominence of the three separate elements, but an exact description of the nerves, cells, structures, &c., involved in each process is out of reach. And as brilliant white light is of necessity composed of red, blue, and yellow rays in definite proportion, so no mind can be considered properly constituted unless there is distinct evidence in it of well-marked qualities of feeling, thought, and will.

MIND AND BODY—INTERCHANGE OF ACTION.

IN every human being there is, hypothetically at any rate, a certain quantity or charge of nervous energy, which must eventually be expended in some way or other. There are three principal directions which it may take—along the course of the feelings, the thoughts, and the will—all three; or it may chiefly and morbidly be discharged in one direction only. Now it is possible to a greater or less extent to direct this nervous energy into one or more of the three channels, and in some measure to regulate its force. And not only so, but energy flowing in one direction—say with the feelings—may, especially in early life, during the period of growth and development, be checked to a considerable extent and diverted into either the course of the thoughts or the will, one or both.

The following may be quoted as a few arguments in favour of this view.

(a) When a little child receives an injury, it is wonderful how a really sharp blow may be

rendered comparatively imperceptible by directing its attention suddenly to a bright light or colour, a loud or musical sound, or something which acts for the time being with great intensity on some of the nervous fibres engaged in one of the special senses. Again, when a child is peevish, or cries without a sufficient reason, a little tap or a sharp word speedily puts a stop to it. In one instance there is stimulation of certain nerves ministering to common sensibility, in the other that of the nerve of sight or hearing. The action in both instances is similar.

(b) The powerful stimulation of one set of fibres acts occasionally in direct antagonism to that portion of the nervous system involved in some of the emotions. Mark the effect of music through the medium of the nerve of hearing. Does it not calm the passionate, encourage the timid, and soothe the distressed? On the other hand, plaintive airs have occasionally a tendency to develop certain emotional manifestations, thus indicating to some extent the temperament of the individual, and the facility with which his attention might be directed from one object to another.

(c) Although hiccough and sneezing are

generally speaking involuntary or reflex actions, they may be readily checked by the sudden stimulation of some other portion of the nervous system. The effect of some startling intelligence or any sudden shock on these actions is too familiar to need description. Indeed, both hiccough and sneezing, especially the latter, are to a slight extent under the control of the will. At any rate the will is able to defer them. And if these so-called involuntary acts can be controlled in any degree by the will, it is reasonable to suppose that such an influence, slight though it be, may extend to phenomena of a similar nature.

(*d*) Pain — positive, even severe pain — vanishes in a most remarkable manner when attention is riveted on something else. This is a most important truth, and one which I think is not properly appreciated. The principle here involved is that which in many cases is associated with the word “change,” as frequently employed by medical men. They recommend their patients “change of air,” but in many instances, more particularly in nervous diseases, change of scene or mode of life is the most efficacious ingredient in this prescribed change of air. It

is certain that nervous symptoms may be, and sometimes are removed, by change from the pure and invigorating air of mountainous districts to the dirty, murky atmosphere of a manufacturing town. Some persons frequently suffer from indigestion even after an ordinary frugal meal, and yet seem to be able to enjoy occasionally a rich and bountiful repast without the slightest inconvenience. In the latter case the mind is for the most part pleasantly occupied in cheerful and amusing conversation, and thus the action of some of the great nervous centres and their branches in the vicinity of the stomach is greatly modified. This familiar illustration, amongst a host of others, shows what a powerful influence the mind has, not only over the body, but over certain organs contained in that body. Many of those who have passed through the ordeal of competitive examination must have experienced (as I have done on many occasions) constant dyspepsia for many weeks previously, but the examination being successfully disposed of, digestion has been at once and completely re-established.

The disagreeable sensation of tolerably severe cold is sometimes scarcely perceived when one

of the special senses is powerfully stimulated, or the mind earnestly engaged in thought, or deeply affected by emotion. It is possible for some individuals to stand still for a considerable time in cold weather and witness a grand exhibition of fireworks, or listen to the performance of exquisite music, without feeling even chilly. I do not pretend to assert that under such circumstances the cold has no effect upon them in spite of their indifference to it. For those who do not care for pyrotechnic displays, or who do not thoroughly appreciate music, such phenomena have no attraction, and the perception of cold is for the most part in direct proportion to the number of degrees below temperate, always taking into consideration the innate susceptibility of constitution in each case.

And I think there are many who must have met with similar experience as regards thought. As in the previous illustration, the earnest thinker for the time being loses himself in a state of abstraction, regardless, and in some instances totally unconscious, of what is taking place around him.

Again, when powerfully affected by one of the emotions, say grief, it is quite certain that in

some constitutions the severest cold is barely, if at all, felt, when standing by the open grave of a very dear friend or relative. To one suffering really poignant grief the sensation is so massive and voluminous, and involves so much of the nervous system, as well as many of the muscles, that it renders the ordinary action of cold on the common sensibility of the skin, for a time, almost, if not wholly, imperceptible.

This illustration may be appreciated to its fullest extent by husband or wife, the hearts and lives of whom have been linked together in the most perfect bond of love and union, when one of them is called upon to experience the overwhelming bitterness of separation in witnessing the burial of the other.

(e) Dr. Broadbent, of St. Mary's Hospital, London, in an interesting lecture on the Construction of the Theory of the Nervous System, delivered at the Wakefield Asylum some years ago, mentioned a circumstance which points in the same direction. He argued that the unnatural action of the lower limbs in a certain form of paralysis, which principally affects the legs, especially for the first few months, was due to *concentration of energy* in the lower part of

the spinal cord. This was the result of a great portion of the structure intended for the transmission of motor impulses being rendered useless by disease. Thus the removal of the natural energy from one portion of a great nervous centre appears to increase the power of that which remains intact, just as the impairment or destruction of one special sense is very frequently followed by increased power and acuteness in one or more of the others.

(f) Some four or five years ago, I met with two extremely interesting cases of epilepsy, possessing features which assist in corroborating what has gone before. In both instances, sometimes an attempt to ward off an approaching attack was successful. Such an event is only possible when the fit is preceded by warning. In the one case (of a youth), it was accomplished by the patient seizing the right wrist with his left hand, and holding it down very firmly on the right thigh for a short time. Here, it is plain that the energetic action of certain groups of muscles, *seconded most likely* to an appreciable extent by the power of the will, was instrumental in preventing that combination of unconsciousness and muscular spasms familiarly known as

an "epileptic fit." In another instance, a man in middle life, who told me he knew the fits had been brought on by alcoholic excesses, immediately he received warning, sprang up and ran as quickly as possible 200 or 300 yards. There can be no doubt in this case the violent action of so many groups of muscles simultaneously seemed to absorb and altogether overwhelm the nervous explosion, which was about to take place in the shape of an epileptic attack.

(g) It is said that an ague fit may be deferred by putting back the clock without the knowledge of the patient. The fact that the fit has come on at the same time, or thereabouts, say five p.m., regularly every day, or every other day, produces that state of mind in the patient which may be termed the habit of expectation. If, however, the clock has been altered, unknown to him, and indicates four p.m. instead of five p.m., the habit of expectation—by its powerful, or at any rate decided, physical effects on the nervous centres—defers, or is instrumental in deferring, the attack for an hour. This is another instance of the mental condition modifying bodily phenomena, and in this case even affecting the course of disease

In the same category, I think, might be placed the following interesting fact. In certain cases of long-continued vomiting, after all kinds of remedies have been prescribed, and special rules relating to diet have been studiously observed (in both instances without benefit), the patient has suddenly been seized with a craving for some particularly unsuitable kind of food. His or her desire has been gratified with the immediate result of improvement, and in the end perfect recovery. In one case that came under my own notice some years ago, and in which I had administered everything I could think of likely to stop vomiting, and suggested various kinds of diet, the lady presently discarded all my medicine and advice, and took a small veal pie, upon which the vomiting immediately ceased. Another case is recorded in one of the medical journals of a boy aged twelve years, or thereabouts, in a very dangerous condition, who was also troubled with urgent vomiting. After the failure of all ordinary treatment to check it, he expressed a desire for some pork pie and a glass of beer. His request was granted, the vomiting ceased, and, as far as I remember, he forthwith steadily but slowly recovered. Of course, common sense would

prevent any one from arguing that because of the occurrence of a few curious cases like those just related, it would be judicious to allow sick persons to select their own diet. Such cases, however, seem to point to the manner in which vomiting and other analogous phenomena may sometimes be removed. Moreover, they show how morbid action in one part of the body may be arrested by intense stimulation of a comparatively small portion of the nervous system.

In the foregoing cases, the gratifying sensation experienced in the nerves concerned in what we understand by relish, was all-sufficient to put a stop to serious functional disturbance in one of the most important organs in the body.

That which is generally known as counter-irritation is merely another illustration of the same idea. There is some unnatural physical change, in fact pain, in a certain part of the body. By the use of a stimulating or irritating application in another locality, the unnatural condition is removed from one group of nerves to another, and in this manner the original pain gradually diminishes, and at last totally disappears.

It appears, then, that the inherent energy of

nerve cells and fibres, whatever be its nature, may be transferred from one portion of the nervous system to another, or it may be concentrated in a particular direction. And further, morbid activity in one portion may be diminished or even annihilated, by arousing the dormant energy in another. And here, perhaps, it is as well to call to mind the intimate connection there is between the will and muscular movements.

Commencing at birth, by degrees, after numerous unsuccessful attempts, muscles and groups of muscles move in obedience to a sensation or a wish. Voluntary observation and adjustment are followed by general voluntary power, and finally control of the feelings and thoughts. Systematic exercises, then, which involve the volitional portion of the body, *i.e.*, the voluntary muscles, may be expected to produce an increase of all tissues and parts which contribute to the origin, maintenance, and continuance of healthy volitional action, and as a final result, bearing in mind the building up of the will on the erratic movements of infancy, there ought to be an increase in the power of the will.

MIND AND BODY—EXERCISE AND EXCELLENCE.

ALL matter more or less continuously engaged in movement, or in what is termed “vital action,” sooner or later undergoes definite changes,—in fact wears out. Nevertheless, everything is better for use or exercise. And this is true of all human actions, whether of body or mind. The deterioration of machinery when it has not been in motion for a considerable period is a familiar illustration of the baneful effects of disuse. And any structure or machine specially designed for the purpose of movement or action speedily gets out of order when, from any cause whatsoever, it is rendered motionless or inactive.

In the human body, then, no matter what the organ or tissue, use or exercise begets growth, development, and power; disuse or the want of exercise, wasting, degeneration, and weakness. Hence, it might be reasonably expected that a constant and judicious use of the cells, fibres, &c., collectively involved in the expression of feeling, thought, and will, would promote tissue

growth and mental development; conversely, if the same structures were permitted to remain in a permanent state of inactivity, or of sluggish action unduly prolonged, it would, theoretically, result in obtuse feelings, intellectual degradation, and an enfeebled, vacillating will. And this is strictly in accordance with experience.

It is necessary to bear in mind that use is a totally different thing from abuse, or excessive or injudicious use. And this is the explanation of some of those evils which are alleged to occur in connection with systematic exercises. A bridge built expressly to support a weight of 200 tons or thereabouts, could not be expected to bear five times that amount without some indications of incompetency or failure. It would, in all probability, at some time or other fall with a sudden crash, or sink and totter until it was absolutely unfit to fulfil the original intention of the architect.

But to proceed with a few illustrations:—

(1) *Muscles*. Regular exercise short of over-fatigue promotes growth, facility, as well as accuracy of movement, and power, of which the strong arm of the blacksmith and the generally well-developed and active muscles of

the gymnast furnish good examples. The complicated movements of the acrobat are executed with the greatest difficulty at first, even when commenced, as they usually are, during childhood. By degrees, after tremendous repetition, they become more elegant and perfect, until at last they are practically automatic, that is to say, performed almost independently of the intellect. And thus it is with the accomplished pianist or violinist.

The wasting, degeneration, and weakness resulting from an inactive condition may be frequently observed in the muscles of a limb when from any cause they remain for a lengthened period practically motionless.

(2) *Organs.* When double, the destruction or inefficiency of one throws more work on the other, and the latter becomes enlarged in consequence. There is no doubt that movements which necessarily accompany a more energetic action of the lungs produce development of those organs and expansion of the chest. Hence it is that all properly regulated exercises, involving increased action of the respiratory muscles, are of great importance. And they are especially valuable when the chest is narrow, and its

capacity smaller than natural. The development of one lung is very marked when the other is comparatively useless, and the same observation is quite as applicable to all double organs.

(3) *Senses.* The loss or absence of one sense increases the acuteness of some one or more of those remaining intact, because they are exercised more frequently, and with greater attention and accuracy. The acuteness of hearing with which many totally blind people are endowed is familiar to every one. In fact, in a great measure, they walk by hearing not by sight, and their sense of touch is oftentimes truly marvellous.

And further, it is well known that, apart from the loss or absence of any one sense, each faculty may occasionally become educated and developed to an almost unlimited extent. The discriminating ear of the musician, and the delicate touch necessary to execute rapid movements with precisely the requisite amount of force and duration, involve long-continued, patient, and persevering efforts in order to obtain anything like excellence.

Such acuteness of sense can only be acquired for the most part by great practice, and of course the various parts and connections of the

organ in each case must be thoroughly sound. Indeed it is only reasonable to suppose that there is something intrinsically and unusually good about it. Perhaps the size or number of fibres passing to the brain may be larger than usual, or the nervous tissue in the organ itself more extensive, and therefore more susceptible to external impressions.

(4) *Mind*, including thought, feeling, and will.

(a) *Thought*. In connection with this subject perhaps that most worthy of notice is memory or retentiveness. Some authorities contend that memory implies growth of new branched cells, and possibly further development of old ones. One thing is absolutely certain, that memory may be vastly improved by judicious mental exercises. On the other hand it rapidly deteriorates if not properly cultivated.

(b) *Feeling*. All kinds of emotion, by frequent repetition, rapidly obtain and occupy a position in the mind from which it is extremely difficult to dislodge them. The emotions of love, grief, anger, fear, &c., only require enumeration in order to prove the accuracy of this statement. For what is the result of constant or frequent yielding to any one of them? An exaggerated

and generally visible display of emotional manifestation on the slightest provocation. A step or two more, and the mind, which demands for its soundness a certain variable proportion of each of the three elements, becomes reduced to little else but a turmoil of feeling, a condition not many degrees removed from positive insanity ; and although the constitution of the mind would be clearly incomplete without the various states of feeling, it is highly desirable to acquire the habit, as far as possible, of making them subservient to the control of the will.

(c) *Will*. There are many circumstances constantly occurring in every one's life which demand the assistance or interference of the will. It operates mainly in initiating and regulating actions which are instrumental in giving pleasure or avoiding pain, either in one's self or others. The pursuit of pleasure in some form or other is followed by all people, and up to a certain point it is justifiable ; beyond that, the will, hearing from some quarter, it may be doubtful from whence—but hearing a voice whispering more or less distinctly “Thou shalt not,” comes forward, and if sufficiently powerful, forthwith prevents further progress in that direction. And although

it is sometimes very difficult to suppress the feelings and control the actions prompted by them, the more frequently the will is urged into the conflict and comes out of it successfully, the more easily is the victory obtained in subsequent struggles between duty and inclination. The power of resisting the undue promptings of the feelings in a satisfactory manner is secured by constant, steady exercise of the will, which in that manner only becomes really and permanently efficient.

Use or exercise, then, when properly regulated, in its effects upon muscles, organs, special senses, and mind, has a tendency to produce efficiency of action, which indeed can be acquired in no other manner. And improvement in action really means physical growth. It has, I believe, been distinctly proved that the mind is expanded and strengthened by regular exercise, and it has been suggested that feeling, thought, and will are each represented in the mental constitution by a different physical basis, liable to material increase or decrease, according to the mode, frequency, and duration of its use or abuse.

If there be any foundation for such a suggestion, it is evident that in every individual the

proportion of structures involved in each mental operation may be regulated, or even materially altered, by careful management, thus producing a perceptible modification of character.

MORALS.

MORAL actions, in the widest acceptation of the phrase, comprehend all actions which are virtuous or right, as distinguished from those which are vicious or wrong.

Amongst the various talented authors on mental and moral science, there seems to be anything but unanimity of opinion as to what actions are to be considered moral, and by what standard they ought to be regulated. It is quite impossible for any one to do right unless he has a decided and clear apprehension of what is right or duty.

This is scarcely the time or place, even supposing I possessed the ability, which I feel is lacking, to enter into a disquisition on the numerous difficult problems incorporated in the philosophy of morals. In Professor Bain's profound work on the Emotions and the Will, he discusses the various theories of morals with great care, and in a very interesting manner. In answer to the question, What is morality or duty? he says he considers it refers to the class

of actions enforced by the sanction of some kind of punishment, whether it be that enjoined by law, society, or conscience. He assumes that the imposition of punishment is the distinctive character of acts held to be morally wrong, and then proceeds to inquire why such actions are prohibited—what, in fact, is the groundwork of morality. Referring to the Will of the Deity, Propriety, Right Reason, the Fitness of Things, Dictates of Conscience, Utility, &c., he comes to the conclusion that “the moral rules found to prevail in most, if not all communities, are grounded partly on utility, and partly on sentiment.” Upon this he bases his definition of a supreme moral standard, which he declares to be “the enactments of the existing society as derived from some one clothed in his day with a moral legislative authority.” And such is the correct explanation, according to the Professor’s ideas, of our present code of morality. Although I forbear even to pretend to argue in opposition to the opinions of such a learned and distinguished philosopher, it does seem to me almost inconceivable that so great a mind should ignore the existence of the Divine will in this matter.

However, on the present occasion this is of no practical importance, as I do not hesitate to take for my moral standard, whether or not with sufficient reason does not signify, the Decalogue in all its length and breadth. It is so comprehensive, as it seems to me, that it may be said to include most, if not all, reasonable theories which are connected with morality. Altogether apart from the religious aspect of the question, amidst so much diversity of opinion, it becomes natural for the thoughtful mind to ask, What kind of actions is it most desirable to encourage and cultivate? To which I answer, Those which are best calculated to preserve and lengthen life, as well as to promote the present and future happiness of each individual of the human race. Such actions are clearly indicated in that brief but well known moral aphorism, "Fear God and keep His commandments, for this is the whole duty of man."

Here then is the essence of morality, simple and perfectly intelligible to any one who is willing to receive it. For the sake of argument only, let it be granted that this is *merely* a theory, just one among many other theories and nothing more. Can a better one be found?

—that is to say, one which is more likely to be followed by long life and happiness, provided only it be honestly and thoroughly carried out in practice. Supposing everything the Atheist wishes and hopes—but sometimes, perhaps oftentimes, fears—may not be true, even he would probably find the adoption of such a theory, and the regulation of his conduct thereby, to be greatly to his advantage as regards health and prosperity.

However varied or plausible the theories of moral philosophers on this subject, the code of morality which is described in, or may be inferred from, the Decalogue is the one, in this country at any rate, by which men and women for the most part profess to regulate their actions.

Such being the case, it is evident that the moral responsibility incurred differs to an enormous extent in different individuals. In judging of any one's actions there are many circumstances which must be taken into consideration. And if anything like a fair and correct estimate of character is to be obtained, a due allowance must be made for every modifying influence. First of all if it be possible, although sometimes an extremely

difficult problem to solve, the motive for any distinct line of action should be ascertained. By the motive I mean the actual motive, viz., that circumstance or combination of circumstances which not only prompts the action but regulates the machinery necessary to ensure its due completion. For it must not be forgotten that the apparent or professed motive is often very far removed from, if not diametrically opposed to, the actual one. But again, innate tendencies, parentage, early training, example, social position, occupation, custom, domestic relations, one and all exercise a powerful influence over the morals of any given individual.

The effects of poverty and wealth, good health or the reverse, must not be omitted. And further, manners and morals vary so much in different climates, nations, and communities, that these also must be taken into account, as well as any religious or other peculiarities to which no reference has been made. Examples might be given without number. The responsibility, as I apprehend it, required of every man is gauged by his actual knowledge of moral laws, and an accurate estimate of the efforts he makes to do his duty. It needs no elaborate process of

reasoning to prove that the degree of moral excellence cannot be satisfactorily registered without making a proper allowance for innate or other constitutional peculiarities, physical or mental, and all circumstances which are outside the pale of voluntary control. For instance, how is it possible for the child of the murderer, drunkard, or thief to escape from such an evil heritage? And although he is doubtless morally responsible for his actions, it is scarcely just to compare his conduct with that of any one born under generally favourable conditions. Vicious tendencies of character are as certainly transmitted from one generation to another as physical defects, therefore it is desirable to use the most strenuous efforts to eradicate, or at any rate diminish, such tendencies, whatever be their nature.

Can it be done? To some extent I believe it is possible. By what means? Early and judicious moral training (of which there is far too little in schools generally), and exercises, of whatsoever kind, calculated to increase the power of the will.

Without venturing to attach an exaggerated importance to the part muscles are compelled to

perform in carrying out the dictates of the will, I believe they form an item in it worthy of more careful attention than has as yet been recognised. The manner in which they probably assist, according to my hypothesis, in controlling the operation of the will, will be explained hereafter.

MORALS AND DISEASE.

HAVING briefly described, in somewhat general terms, that which is usually accepted as the signification of the word moral, I will endeavour to point out the intimate relation existing between morally wrong actions and disease.

Although fully conscious of the exceptions which may be taken to the assertion, I think it will be found, on strict and impartial investigation, that the following proposition is substantially correct, viz.:—That much disease arises directly or indirectly from excessive indulgence in the gratification of the senses or appetites, or some form of selfishness. There are those, I know, who are very unwilling to accept the truth of this proposition on anything like a comprehensive scale. They would no doubt grant, as every one must, that some diseases occasionally have their origin in self-indulgence, but that such a cause prevails to any great extent they consider a far-fetched and exaggerated notion.

Notwithstanding, disease arising from an action, or a line of action, which is pursued altogether irrespective of consequences to one's self or others, because it is a source of present pleasure or gratification, is, I am convinced, much commoner than appears at first sight. The idea is anything but a pleasing one, but it is not difficult to collect a considerable amount of evidence in its favour. A few illustrations will make it more apparent.

And first of all, I will direct attention to a few diseases of the nervous system, the occasional and sometimes absolutely certain origin of which few would dare to deny. Take, for example, delirium tremens, epilepsy, insanity, inflammation of the brain and its coverings, and certain forms and degrees of paralysis, &c. All these may be, and undoubtedly are, caused by alcoholic excesses, but it must not be forgotten that there are other forms of excess which are all-powerful to produce many of the same diseases. Perhaps two or more may be acting simultaneously in the same direction. Can the causation above referred to be contradicted?

Again, has it not been demonstrated to a certainty that many lung diseases are more fatal

in constitutions which have been undermined by riotous living? And although it is difficult, if not impossible, to produce proofs, excesses of all kinds render the heart much more liable to organic disease, if they do not actually give rise to it. Is it quite certain that excessive self-indulgence has nothing whatever to do with the development of some forms of cancer, which might otherwise remain dormant for years? The mechanical irritation of a clay pipe has long been recognised as a probable exciting cause of malignant disease of the lip, and a blow precedes cancer of the breast too frequently to be disregarded. Although a peculiar constitution must exist, added to this there is usually an exciting cause before the morbid growth commences.

Again, diseases of the stomach and liver are unquestionably brought about in some instances by the too frequent and unrestrained indulgence in the pleasures of the table, and diseases of the kidney occur much more readily under the immoderate use of alcohol, and a rich diet. And the two well-known diseases, gout and rheumatism, and their various phases, certainly flourish if they are not actually developed under the influence of a luxurious mode of life.

In order to make myself intelligible, I need only hint at the immense amount of terrific disease, induced by immorality, which pervades the dense population of our large towns, although by no means limited to them. Such disease not only undermines the constitution of those individuals originally attacked, but what is much more serious, and of far greater importance, commits fearful ravages on the health of succeeding generations.

Therefore, I think, if this subject be thoughtfully examined without prejudice, it will be found that from the crown of the head to the sole of the foot, commencing with the various forms of cerebral disease, and terminating with what I presume may be termed that agonising complaint of the great toe, deficient self-control stands, as regards causation, in a very prominent position.

But, it may be urged, excess in all its forms has not so very much morbid influence, otherwise the amount of disease would be more commensurate with the great prevalence of bad habits. Excess cannot be the *sole* cause of all these diseases. There must be a peculiarity of constitution or a something else to produce the effect. Most likely, but it is not the less certain,

that alcoholic as well as other forms of abuse have been positively proved to produce a certain percentage of disease. And if we have this *positive* evidence of such a sequence in 10 or 15 per cent. only, it is not irrational to infer that the proportion in all probability is considerably greater, although incapable of precise demonstration.

If it were possible to strike six persons on the leg in the same place, with the same weapon, and exactly the same amount of force, it would not be surprising if the results differed somewhat in each case. Perhaps in one or two instances only would the leg be broken. Would it therefore be logical to say that the blow had not very much to do with it? that there must be a certain something, say "*fragilitas*," superadded?

All diseases arise from a composition of causes, some one or more of them being markedly prominent. And there are few which are more conspicuous than an unbridled indulgence in the gratification of the senses. But independently of the direct origin and propagation of disease to which I have alluded, are there not many undoubted morbid tendencies produced by drunken parents neglecting to make proper

provision for their children? Are not these children frequently born and bred in typically unwholesome dwellings, with but a scanty allowance, and that too of an inferior quality, of the bare necessities of life? Certain instances of rickets (a disease frequently attended with deformity through defective nutrition), consumption, glandular, and other wasting diseases, clearly have their origin in families struggling for existence under such miserable conditions.

Can we not further detect in marriages of consanguinity, and the union of delicate persons, a certain amount of selfishness, although it may be disguised in the garb of expediency? The intermarriage of blood relations is generally acknowledged to be for the most part unadvisable. For if there be any issue, except both parents are positively healthy, and free from hereditary defect of constitution, it will in all probability lead to an increase of disease.

And again, the majority of the children of two individuals delicate in the same kind of way, consumptive for example, are almost certain to be very short lived, or unhealthy in some way or other. Disease is not always transmitted in the same form. Children of persons suffering from

consumption, if they do not inherit their parents' disease, are frequently afflicted with various nervous or other troublesome complaints, and it is by no means unusual to meet with consumption as a descendant, so to speak, of cancer, and *vice versa*. The habitual drunkard, who is rightly regarded as a person of unsound mind, may have a family in which it is not uncommon to find epilepsy, St. Vitus's dance, severe neuralgia, hypochondriasis, &c. Numerous other examples might be given to the same effect. And although much disease is handed down practically unaltered, the transmission of it from generation to generation is frequently accompanied by numerous and substantial modifications.

Granting that selfishness in some form or other is at the root of these imprudent alliances, it might, however, be argued, and with very good reason, that if somewhat delicate health or the history of constitutional disease, on one side or the other, were considered sufficient pretexts for not entering into the married state, there would be an end to many happy marriages, and other evil results would most assuredly follow. Nevertheless, it is better that these matters should be thoroughly well understood, for the union of two

persons who are delicate in the same kind of way is a very serious matter for their children, whose lives will probably be composed of various degrees of sickness and suffering—in fact laden with wretchedness. And although such marriages are not likely to be abolished by directing special attention to probable evils connected therewith, their number may possibly be diminished, and thus a certain amount of disease prevented.

And what other word but selfishness so aptly expresses the conduct of that mother who forsakes her own child for a time, and places it on the breast of a stranger, in order that she may indulge in the festivities of the ballroom, or some other form of entertainment? Is this one of the signs of progress and civilisation? Is it natural? Is it human? Is it right? In very truth it appears to me the most unnatural thing in nature. Even if the foster-mother be sober, it is not unlikely that something may go wrong with the child. The infant's best health depends not only upon the normal condition of its mother's body, but also upon a peculiar mental state which cannot be acquired at will by a stranger. It is well known what a powerful influence the emotions of grief, anger,

terror, &c., exercise over the quantity and quality of the various secretions of the body. *Apropos* of this Dr. W. B. Carpenter relates some remarkable instances in which children have been actually poisoned by taking the breast whilst the mother was the victim of some violent mental emotion. Indeed, I have seen sufficient proof of this in my own children, in a less degree, under somewhat similar conditions. Notwithstanding those who are sceptical on this point, I feel thoroughly convinced that the state of the nervous system in the mother when she is nursing does affect the health of her child, not only in body, but most probably in mind also. It is not to be expected that the foster parent will display that tender emotion towards her nursling, or be so anxious to control her feelings and passions as a true mother. And is it not reasonable to suppose that the powerful and doubtless unique feeling of exquisite tenderness exhibited by a truly natural mother towards the infant at her breast must have a certain appreciable value in its nutrition and development?

It appears strange, although probably familiarity with the danger makes us despise it, that we do not sufficiently recognise the fact that much

disease is directly produced by disregarding laws of nature as plain and invariable as those of gravitation and motion.

Is it likely we shall escape disease if we constantly perform and encourage actions which we know will assuredly produce it? This is a question which may be asked as appropriately, and with quite as much force, as that addressed by Pope in the following couplets to individuals disposed to think laws of nature might be modified for their special benefit.

Shall burning Etna, if a sage requires,
Forget to thunder, or recall her fires,
On air, or sea, new motions be imprest,
Oh! blameless Bethel! to relieve thy breast?
When the loose mountain trembles from on high,
Shall gravitation cease if you go by?

It is evident, then, if the proposition which I have attempted to illustrate be correct, that by a more frequent and thorough exercise of the will much disease might be altogether prevented, and as a natural consequence many lives saved, or at any rate prolonged.

MUSCLES AND MORALS.

IN the section on muscles I have attempted to point out the direct beneficial results physical exercise has upon the body and its organs. But this is not all. Important salutary changes may be effected from what may be termed its secondary, indirect, or physico-mental action. Matter and mind act and re-act on one another. In man's present condition the feelings are very prone to become unruly and rebellious, thus tending to produce actions which are neither desirable nor right. It is therefore of the highest importance to concentrate the power which governs them as much as possible. And this leads me to formulate a second proposition, viz., that the strength of the will is probably increased by systematic physical exercises. I presume of course that increased volitional power is necessarily followed by a more perfect control of the feelings, provided always that there is a clear apprehension of what is right and wrong.

Is it possible that growth and development of muscle, induced by exercise, can have any

conceivable connection with a high moral tone ? I believe it is, and for the following reasons :—

(1) Emotion is usually accompanied by certain outward and visible manifestations which are more or less under the control of the will. Co-existent with the condition of mind and muscles, there is frequently considerable physical change in some of the glands and viscera. Now, by exercising a restraining power over the muscular element, it is possible to stifle, or at any rate reduce, the violence of the emotion. And the more the muscles have been regularly trained, the more rapid and perfect will be the control of the feelings. In some persons, at the command of the will, the muscles usually involved are fixed, glandular and other effects are less marked, and finally the emotion gradually dies away. The muscular tremor which is frequently more or less associated with the emotion of terror would be far less likely to occur in one whose muscles had been systematically used. Again, the well-known tendency to faltering and hesitation of speech, as well as other irregular movements, which occur under the influence of rage, are unquestionably reduced to a minimum when controlled

by a powerful system of muscles. The movements and sensations which are experienced in grief and laughter may, in some measure, be diminished, or, in rare instances, entirely suppressed by a powerful volitional effort. In all probability it has been observed over and over again, by those who have endeavoured to control their feelings under the varied conditions above mentioned, that the muscles have, at any rate, a voice in the matter. And it is natural to suppose that if the muscles are in a first-rate condition, the conflicts constantly occurring between will and feeling are much more likely to end in favour of the former.

(2) The attitude of an individual who is determined to carry out his plans is further evidence of the connection between muscles and character. He clenches his fist, stamps his foot, and says, with emphasis "I will," simultaneously; and his muscles generally are in a state of contraction. Of course it might be argued that these visible signs of determination are simply indications of an excitable character. This may be, but it proves that the contraction of muscle is more or less intimately connected or associated with firmness of purpose.

But further, is there not a muscular element in that unflinching resolution to bear severe pain without outward manifestation? I will quote a familiar instance. The long inspiration, and holding of the breath, which are the customary preludes of a great effort, together with the fixing of the muscles generally, and the clutching of the arms of the operating chair, are phenomena which I, and doubtless many others, have frequently experienced when about to undergo that "horrible wrench" at the hands of the dentist. And in the absence of an anæsthetic, no amount of dexterity, in extracting a grinder pretty firmly fixed in its socket, can make it anything else but a horrible wrench.

(3) Muscular exercise produces development of muscles, and therefore power, and increased facility of movement. The feeling of power, and a readiness to act in obedience to a wish, must of necessity engender confidence, which is a mental process springing out of physical strength. The moderate use of muscles generally renders them much more efficient when in action, and there is less waste. Much less fuel, *i.e.*, nervous energy, is requisite to maintain the nicely-balanced work of carefully-trained muscles. For

in many instances even powerful and complicated movements may be performed almost imperceptibly in a perfectly regular manner. An individual in good training can walk, run, or undergo an amount of physical exercise which would be positively unendurable by any one who had not passed through some previous discipline of this kind. The latter, apart from losing strength by profuse perspiration, would be greatly disturbed by the excessive action of his heart and bloodvessels, and at the same time experience an overpowering sense of lassitude, while the former would probably feel nothing but exhilaration and enjoyment. What cannot be accomplished by training? Take for examples the admirable swim of Webb from Dover to Calais, and the prolonged walk of Weston the pedestrian, both feats of prodigious and unexampled endurance. Is it not quite certain that both individuals continued their efforts by the aid of their muscles? In each case there was undoubtedly an intense feeling of fatigue amounting to pain, well calculated to put an end to their exertions. Yet they were enabled by a powerful exercise of the will, greatly aided by, if not actually arising out of, muscular development

and power, to bring their labours to a wonderfully successful termination.

May not any one of the emotions, attended as they are with certain outward and visible manifestations, be fitly compared with that sensation of organic life known as fatigue?

And is it not, moreover, true that they are all more or less under the control of the will? In some instances, if not in all, the first evidence of volitional control may be observed in the contraction of muscles which are intimately associated with some of the physical phenomena embodied in the particular emotion. Take for example crying in a little child. This manifestation of pain, discomfort, or temper, as the case may be, is attended with the movement of sundry groups of muscles, and increased flow of tears, all of which may be checked by a sharp word or tap, *i.e.*, by concentrating energy or attention in some other portion of the nervous system.

(4) Some instances of St. Vitus's dance illustrate the intimate connection existing between muscle and will. The growth and development of volition is very gradual, especially for the first ten or fifteen years of life, just at the time when

this disease is particularly apt to occur. At this period, the harmonious action of various muscles and groups of muscles is easily disturbed. Although they act in unison, there is not cohesion of action, and they have not become, as they do subsequently, almost automatic. The several germs of volition are fragile, and their radicles weak, and readily uprooted. Suddenly the child receives a great shock, in the shape of a fright, which ends in a general disorganisation of voluntary movements. In severe cases, while talking and walking are barely possible, almost every movement attempted is a failure. And sometimes several weeks, or even months, elapse before regularity of movement can be restored. Under the influence of emotion the involuntary movements increase, thus indicating that what remains of the will is almost powerless. On the other hand, rhythmical muscular exercises are sufficient, in mild forms of this complaint, to re-establish perfect volitional control.

(5) Of course it is not by any means an universal fact, but it is matter of observation that the woman is more emotional than the man. Has muscular development any share in the production of this difference? The nervous

organisation is so arranged in the woman that her feelings under certain circumstances are more voluminous, and probably more powerful than those of the man. They are not so equable, and more fluctuating, hence a more complete and efficient volitional system is necessary to prevent visible manifestation of such feelings. Instead of this, the muscles of the woman are smaller, much less developed, because not so often used. And so, as a rule, the woman has less control over her feelings than the man, precisely what might be expected.

This general truth, and a most important one it is, cannot, I think, be denied, if the whole class man be compared with the whole class woman. Some of those who deny it, and I know they are numerous, do so simply, as I imagine, because they happen to be acquainted with a few strong-minded women and weak-minded men. This does not affect my argument, which is really based upon differences of physical and nervous organisation, training, occupation, &c.

(6) During convalescence, after acute disease, especially if severe or protracted, there is

frequently a marked deficiency of control of the feelings. Has the wasting of muscle anything to do with such a condition? Although general wasting of the body and increased intellectual activity are often co-existent, it must be remembered that intellectual activity is not volitional power. Under a long and painful illness resignation is no uncommon phenomenon; at the same time it is scarcely, I think, the rule. The occasional tear, which issues stealthily from the corner of the eye, and trickles slowly and almost imperceptibly down the sunken cheek of the invalid, indicates that, although there may be mental calmness, the heart is yet full of tender emotion. In spite of all the elevating and controlling influences of religion and affection, the wasted form is unable to repress some of the visible manifestations of emotion. The glandular phenomena of the emotion, if not the only ones, are usually the most prominent under such circumstances. And indeed, if my observations have been correct, when death is drawing very near, and muscular power well nigh gone, the silent tear is the last and only indication of sorrow which it is possible for a human being to exhibit just before dissolution.

(7) But further, systematic exercises assist in the control of the feelings and appetites.

(a) *By exhaustion.* It is clear that by expending a certain amount of innate nervous energy which must be discharged in some way or other, in a definite direction, its tendency to take any other course is greatly diminished. If it is not guided, or if no artificial outlet is made for it, so to speak, it will as a matter of course find a vent where there is least resistance; in fact, the weakest part will be the first to yield. That, as every one knows by personal as well as general experience, is apparent in the inclination to ease, luxury, and self-indulgence in a variety of ways. There is no doubt that the stream of nervous energy, if unchecked, has a tendency to flow swiftly in the course formed by pleasure, and to spread and deepen in that direction. The majority of those who allow themselves to be borne along by it find that it does not lead to ultimate success or safety. For, in the ordinary course of events, it oftentimes ends in dissatisfaction and difficulty; sometimes in serious loss of health, or complete ruin of body and mind.

(b) *By habit.* Regular exercises become so much a part of the individual that they are

performed with scarcely any effort. Early rising, for instance, especially in the cold grey dawn of a wintry morning, is at first an act of self-denial, but by frequent repetition the effort as such disappears. Is it not reasonable to suppose that an active, vigorous condition of muscle is of material assistance, not only in executing the necessary movements for getting up, but in forming the resolution to do so? After a time the act closely resembles an automatic one. And it is certain, that by *habitually* controlling the feelings and actions as much as possible, the necessary victory is at last gained with comparative ease.

It may be urged, in spite of all these illustrations and arguments—Is it possible to do more than theorise? To know the cause of disease is half way towards curing or preventing it. That the various forms of pleasure, to which many of us are liable to become, and frequently do become, slaves, produce a tendency to much serious disease cannot be contradicted. But it may be said that this is an exception. By no means. It will be found that the total surrender of self to the pursuit of what is called pleasure is the key to the solution of many a difficult etiological problem.

CONCLUSION—REMARKS ON EDUCATION.

NOW, if excessive self-indulgence has the morbid influence I have ascribed to it, as a matter of course it follows that an increased power of the will, and a proper and more regular use of it, must prevent much disease. It has been shown that some of the more important physical phenomena usually associated with states of feeling are directly influenced by the will; in other words, the movements of muscles in connection with emotion may be checked, and sometimes almost extinguished, by volitional control. Moreover, judiciously selected mental exercises are without doubt valuable aids in regulating the action of the will. A due supply of proper food for the mind is absolutely essential if it is to remain in a healthy condition. Unless constantly occupied in the contemplation of something good or useful, it will speedily absorb anything attractive, which, although easily obtained, and perhaps productive of much present enjoyment, is in many instances nothing

better than a dangerous poison. There is no doubt that if the will is strengthened by means of physical exercise, and the intellect wisely cultivated, the chances of any emotional disturbance must be materially diminished. Because I advocate in so ardent and decided a manner the importance of physical exercises, it must not be supposed that I venture to ignore valuable training in other directions. On former occasions I have purposely avoided any allusion to religion, which is a most powerful auxiliary in controlling the will. Apart from the soundness or rationality of any special creed, there is no doubt that the influence of deep and sincere religious feeling on every thought, word, and deed is beyond the region of dispute. Nevertheless, I believe an individual of ordinary mental capacity, having decided religious convictions, is able to act up to them much more completely and easily with well-developed and carefully-trained muscles. If I have sufficiently established the reality of the physical connection between the muscles and the will (being a portion of the mind), as well as the influence of the latter through the medium of the muscles in controlling the feelings and actions, my principal object has been accomplished.

But there remains a question well worthy of the serious consideration, not only of medical men, but of every reformer, statesman, and philanthropist.

In what manner, when, and how long should these systematic exercises be employed? Without attempting to give even a sketch of a complete answer, I propose to call attention to one or two points which have occurred to my mind, directly bearing on this important subject.

(1) That systematic physical exercises should take a very prominent place in the training of our youth, irrespective of rank, in both sexes, and that they should form a very much larger share of the instruction given in the Board Schools than they do at the present time. In some of these schools, I believe about half an hour or less once a week represents the time devoted to them. This arrangement appears to me to be worse than useless. What result can be anticipated from it? A little amusement, and possibly temporary fatigue, without any corresponding benefit. In other schools, I understand, an hour is set apart for gymnastics two days a week. This is not enough. They should occupy an hour every day. But in order to

derive from such exercises the greatest possible advantage, it is advisable to regard them strictly as tasks. If the pupils are bored with them during play hours there is not so much chance of effecting any permanent good. For the very essence of recreation in a youth is to throw off all restraint and method, and indulge in a general though somewhat irregular discharge of nervous energy. It has been said there is a tendency to athletic excess in the present day. This may be so in some instances; but athletics, like everything else, become positively injurious when used immoderately and without discretion.

From previous statements it is evident that all muscles must be exercised frequently and with regularity if they are to move with promptness, accuracy, and power when required. The beneficial influence of the Volunteer movement in this direction has been, and I think still is, very important. If a Volunteer really attends drill with regularity, and makes proper use of it, that is precisely what is required in the way of systematic exercise to consolidate his character. Besides many other advantages which he may derive from it, I believe it increases his energy and powers of endurance. During my residence

in London, more than twenty years ago, there was, for a year or two, what might very well be termed a Volunteer craze. I became affected with it, and joined the University College Corps, to the great disgust of my parents, who at that time had an idea that drunkenness and all forms of immorality were inseparably connected with soldiers, or with what might then be called "playing at soldiers." On asking the late Dr. Sharpey's advice, he said, as far as I can recollect his words, "It will improve both your body and mind;" and I believe he was right. As a private, then, for more than six months, I drilled regularly with the long Enfield rifle two hours at a time three days a-week. In addition, on each occasion I walked to and from the barracks, a distance, I suppose, of between three and four miles. During that time my bodily health was perfect and my brain in excellent working order, for I was reading, on an average, at least seven hours a-day. I am sure I never settled down to work so easily, so thoroughly, or with more satisfactory results.

But again, exercises of this description are valuable for other reasons. I believe they tend to make children more quickly obedient. Perfect

obedience is, as I take it, prompt obedience, and that is precisely what systematic exercises help to produce. This I have observed in my own children, when I was able to give them half-an-hour's instruction every day with regularity. Moreover, I have frequently noticed in conversation with an old soldier the readiness and precision of his replies, doubtless due, in some measure, to that systematic training and discipline inseparably connected with his mode of life.

(2) That during the first ten years of life systematic mental exercises, over and above reading and writing, should be chiefly of a moral nature. The beauties and advantages of truthfulness, temperance, and honesty should be impressed upon the youthful mind, and contrasted in their results with the hideousness and degradation of dishonesty, intemperance, and deceit. Without a shadow of a doubt it is far more important during the first decade of human life to point out the difference between right and wrong, and see that there is a decided and proper appreciation of it, than to crowd the brain with facts and figures, or with anything else.

For, as Pope truly says,

'Tis education forms the common mind,
Just as the twig is bent, the tree's inclined.

Yes, education is one of the great questions of the day, and a very difficult one it is. Although there is no doubt about the intrinsic value of a good education, the method of imparting knowledge in the present day is not a good one. I believe there is, throughout the country, a surfeit of education, and further, that it is not of the most suitable kind. In some instances it is both superficial and superfluous, and not unfrequently highly prejudicial to health. Notwithstanding the march of education, it has been found in some of our large towns that, during the last two or three years, immorality and crime in young people has enormously increased. This is only natural, for unless the difference between right and wrong (which is the key-note of a good education) takes a very prominent position in the training of the young, there is simply increase of knowledge. And this is accompanied with additional temptations and greater facilities for the commission of crime. There is a tendency to cram into the brain knowledge (not morality), and as much of it as possible, irrespective of

suitability of subject or the pupil's mental capacity. This is more evident, and as far as I am able to form an opinion much more likely to be attended with evil consequences, in girls. Botany, which is, under all circumstances, an elegant as well as an elevating study, and particularly well adapted for the natural sweetness and refinement of the more perfect female character, is, I am afraid, gradually becoming discarded. It seems to be too tame a study for the strong-minded women of the period, some of whom are partially responsible for the present system of education. They prefer something more exciting, and more gratifying to the curiosity, — even Physiology, which I cannot but think, as a branch of female education, is not only unnecessary and unsuitable, but positively injurious both to body and mind. Not many years ago, I happened to know two little girls, about ten years of age, who were pupils in one of the modern model schools. On one occasion, shortly after coming out of school, during dinner, they were bothering their weary little brains about the auricles and ventricles of the heart. At the same time the food in their stomachs was vainly endeavouring to obtain the

amount of attention necessary for digestion. What a burlesque on education! Auricles and A, B, C! Ventricles and vowels! What an incongruous mixture! Girls of such an age studying Physiology! Could anything more absurd be conceived? Instruction of this kind can only be described as mischievous.

Sixty years ago, Wordsworth recognised the blessings of a proper system of State education in the following graphic passage:—

O, for the coming of that glorious time
When, prizing knowledge as her noblest wealth
And sure protection, this imperial Realm,
While she exacts allegiance, shall admit
An obligation, on her part, to *teach*
Them who are born to serve her and obey;
Binding herself by statute to secure
For all the children whom her soil maintains
The rudiments of letters, and inform
The mind with moral and religious truth,
Both understood and practised.

This sacred right the lisping babe proclaims
To be inherent in him, by Heaven's will,
For the protection of his innocence;
And the rude boy—who having overpast
The sinless age, by conscience is enrolled,
Yet mutinously knits his angry brow,
And lifts his wilful hand on mischief bent,
Or turns the godlike faculty of speech
To impious use—by process indirect
Declares his due, while he makes known his need.

Excursion, Book IX.

In these few lines, as it seems to me, the poet has described the essence of a sound education ; that is to say, one calculated not only to increase knowledge, but to make children thoroughly understand the difference between right and wrong. In this respect there is a marked deficiency in our present educational system.

It seems to me that education is very much in the position of a new and valuable drug containing a dangerous poison of unknown qualities and strength. It is doubtless of priceless value when judiciously used. But, unfortunately, like an untried powerful remedy (such as chloral was a few years ago), when employed without judgment, it is apt to prove prejudicial to health, or even destructive to life. In order to obtain the best possible results, it is necessary to determine the proper dose and the most approved method of administration. This has not yet been done as regards education.

In the meantime, under the present system, the brain is employed too much, and the muscles too little. A little more regular physical exercise, *plus* moral training, and a little less mental forcing, would be better both for body and mind.

And here I venture to make a suggestion, which, if carried out, would prove a great boon to the rising generation. And it is applicable to all classes of society. Instead of taxing every portion of the brain with knowledge of very questionable value, it would be far more useful to give regular instruction in ambidextrous exercises. Their value cannot be doubted. I do not anticipate that it would be possible to make every one really ambidextrous, but I do think if such exercises were made to supersede some of the cumbrous mental tasks now imposed upon the over-wrought brains of many scholars, it would be attended with no small benefit. I commend this to the notice of those who are entrusted with the care and tuition of children.

Seeing how important a position I have assigned to muscular exercise in the training of the young, I might, with very good reason, be asked what sort of character it was usual to meet with in soldiers, professional athletes, prizefighters, &c. All these have had the advantage of abundant regular physical exercise. And, as a rule, they are not noted specially for their strict moral conduct. But there are many disadvantages connected with the lives of such

persons. Except in the matter of physical exercise, the circumstances in the midst of which they happen to be placed, and in which they must remain from day to day, are not, to say the least, calculated to preserve or promote moral principles.

Physical exercises lose much of their value, apart from mental and moral ones, as far as control of the will is concerned, as may be witnessed over and over again in the classes to which I have just referred. The physique of a man may be excellent, and he may have great power over his will, but it is of little use, unless he knows, by rules of right and wrong, when to exercise that power. As well might a vessel classed A1, thoroughly well furnished with efficient machinery, able seamen, and judicious officers, be expected to make, without helm, compass, or chart, a safe and rapid voyage to the antipodes.

In conclusion, however unpalatable and nauseous the idea, disease appears to be in many instances an evil of our own creation, and I cannot help thinking that the allotted term of three score years and ten might be much more frequently attained than is at present the case.

And this might be accomplished without of necessity entailing a life of rigid asceticism, by a constant persevering habit of self denial, steadily and firmly maintained by systematic exercises, thus improving the condition of the Muscles, Mind, and Morals.

